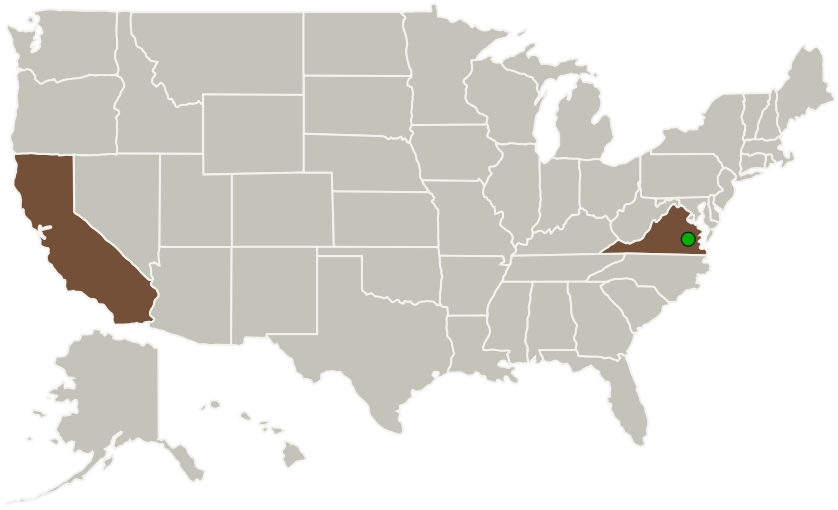
Novel Fabrication Approach for SiC/SiC Thermal Protection System Elements, Phase I

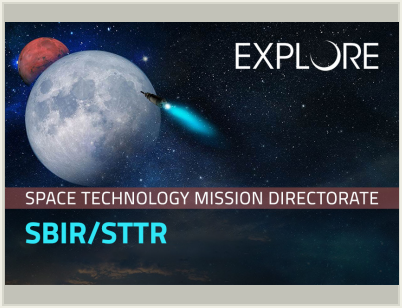
Completed Technology Project (2011 - 2011)

Project Introduction

Durable high temperature materials are required for structural thermal protection systems (TPS) that exhibit a structural load carrying capability at temperatures in excess of 2700ºF. Fabrication times and costs are challenging for high acreage applications such as a structural TPS system. This proposed effort offers a new approach in manufacturing of SiC/SiC ceramic matrix composite components cost effectively with short lead time and high flexibility. The composites will be fabricated via a powder metallurgy/sintering approach using an emerging field assisted sintering technology (FAST). The objective is to fabricate and demonstrate making a cost effective CMC composite by FAST. The SiC/SiC produced will be produced from SiC constituents suitable for TPS applications. Basic mechanical and thermal properties will be measured to assess the promise of the FAST process to rapidly producing a SiC/SiC composite. A technical assessment of the FAST process to produce a 2700ºF+ SiC/SiC will be made as well.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Rolls-Royce High Temperature Composites Inc	Lead Organization	Industry	Huntington Beach, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138371)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Rolls-Royce High Temperature Composites Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert Shinavski

Co-Investigator:

Robert Shinavski

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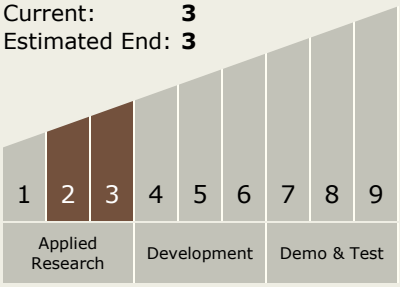
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.5 Modeling and Simulation for EDL

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System